# Swami Ramanand Teerth Marathwada University, Nanded, Maharashtra, India

(UGC-recognized NAAC reaccredited B+grade State university)

# "PHARMACOGNOSTIC STUDIES OF SOME *TRICHODESMA* SPECIES FOUND IN MARATHWADA REGION OF MAHARASHTRA"

**Research Proposal Submitted**

**In partial fulfillment of registration to**

**Ph. D. Programme**

**In the Subject Botany Faculty of Science and Technology**


**Submitted by**

**Miss. Ranjana Sanjay Dhale**

**Under the Supervision of**

**Dr. D. R.Chamle**

Department of Botany

Sharda Mahavidyalay, Parbhani


**December 2024**

# Introduction

The plant plays a vital role in the survival of every living organism on earth. They help to maintain and protect the ecosystem. Herbal medicine has been widely practiced from ancient times throughout the world. These medicines are comparatively safe and environment – friendly than synthetic ones. It has been estimated that herbal medicines are being used by 80% of the world population primarily in the developing countries for primary healthcare.

The study of plant medicines was first described precisely in the basic literature Charak Samhita of Ayurvedic medicine in India . Charak, the author of Charak Samhita flourished in the 8th century B.C.

The term 'pharmacognosy' was first used in 1811 by Johann Adam Schmidt (1759-1809) pharmacognosy is the study of medicine derived from natural sources, including plant or the branch of medical science which deals with the drug plant is called is called pharmacognosy. This science is concerned with the history collection, section, identification and preservation of crude drug and raw materials.
The angiosperm family Boraginaceae includes 142 genera and 2450 species; 43 genera, 209 species, and 7 subspecies are found in India (Punekar and Lakshminarasimhan 2011); of which 13 genera and 45 species occur in Maharashtra, 4 of these species are endemic to India and are found in Maharashtra. *Trichodesma* is a genus of flowering plants in the Boraginaceae family widely distributed in tropical and subtropical regions of world, including India. Brown described *Trichodesma* in 1810, a genus well defined by flowers with a deeply divided and strongly accrescent calyx. Trichodesma is derived from the Greek words, thrix or thikhos (hair), and alludes to the twisted hair that terminate the anthers. The species name is reference to the relatively narrow leaves. Flowers are extremely variable, with those of Trichodesma conforming to the Solanum type and those of Caccinia with free anthers in as asymmetrical androecium.

*Trichodesma* species has been examined for a variety of chemical constituents, viz; monocrotaline, supinine , as pyrrolizidine alkaloids, hexacosane , amyrin, lupeol, non – steroidal and fatty constituents. Pyrrolizidine alkaloids and triterpenoids are common

secondary metabolites in Boraginanceae family and are widely isolated from several *Trichodesma* species.

*Trichodesma* species have hepatotoxic , antitumor , anti-inflammatory and antidiarrhoel activity.

# Study area

Marathwada region comprises districts Chatrapati sambhajinagar ,Beed , Jalana ,Latur ,Nanded , Osmanabad , Parbhani , Hingoli.

# Literature review

Badwaik.P.and Khobragade. P. 2019.*Trichodesma indicum* is found throughout India on roadside and stony dry wastelands upto 1500 meters. Gupta P. S. 2024.Trichodesma indicum is a small herbaceous plant that having slender, erect stems covered with fine, soft hairs. It is used in traditional medicine for its various therapeutic properties. It is used for dysentery, arthritis , arthralgia, skin, disease, as an antidote and diminished Vata and Kapha. Additionally, it is believed to have mild, analgesic properties providing relief pain.

Hamalakshmi, and Suresh Joyhee 2018.The plant is used to treat inflammation and joint disorders as an emollient, anodyne, febrifuge, carminative, depurative and pectoral. The leaves of the plant are used to treat cancer.

Gupta. P. S. 2024 *Trichodesma zeylanicum* is a perennial herb that features slender, branching stems covered with soft, fine, hairs. The leaves are lanceolate to ovate, with a rough, hairy texture. It is used primarily in treating skin conditions. The plants extracts are applied to wounds, rashes and infections due to its antimicrobial and anti-inflammatory effects. It is also used to alleviate digestive issues, such as diarrhea and abdominal discomfort. It has *Trichodesma*, an important pharmacological agent.

Palagani. S. and Kolli. N. 2020In Indian medicine *Trichodesma zeylanicum* is used to treat fever, eye and ear disorders. Its warmed root poultice proved beneficial when massaged on painful areas.

Yumkham. S. D.2019 The Indian species are placed under two sections. Friedrichstalia *(T.khasianum,T.calycosum, T.africanum) and Leiocaryum (T.indicum,T.decurrens,T.sedguickianum,T.zeylanicum)*.

Omar. M. 1983.Asian folklore medicine records the use of the leaves from plant in the form *Trichodesma africanum* plant in the form of water decoction and infusion for

their purgative effects in humans. It is also said that when made into a paste, the roots may be applied to the swollen joints and body surfaces to reduce swelling and inflammation. The aqueous infusion of the leafy parts are also reported to relieve dysentery in children.

Abdelgawad.A. A. M. 2021.Pharmacologically and phytochemical, only a few numbers of *Trichodesma* species have been reported *T.indicum(*L)R.Br.,*T.zeylanicum*(Burm.f.)R.Br.,*T.indicum* D.C., *T. ehrenbergii* . Schweinf.ex Boiss., *T.amplexicaule* Roth., *T.sedgwickianum* and T.africanum L. Among all the *Trichodesma* species, *T.indicum* (L) R. Br.is regarded as the most important one considering its pharmacological values according to literature.

# Research problem

1. Many species possesses pharmacological and therapeutic properties.

2. Chemical characters may have particularly high taxonomic value when they can be shown to be stable . So analysed data of the propose work will be very useful for phylogenetic study of species to fix their position.

3. Alkaloids and fatty constituents are accumulated by some plants.

4. Phenols, sterols, terpenes, are found in many species phenolics have been proved to be greatest taxonomic value, they can be extracted from the plants relatively quickly and readily separated by paper chromatography and the data will be also very useful for interpreting taxonomic relationship of the species.

# Research Objectives

1. To understand the variety of chemicals and how much of them there are in various species.

2. To priorities innovative techniques over extremely old customs and documentation of widely used healing procedures.

3. To create new advancements in the fields of pharmacy, chemistry and medicine.

4 .To advance phytochemical research, which has significantly elevated the status of using therapeutic plants by identifying active principles and their effects on the human and animal systems.

5. Research in the field of pharmacognosy has provided important details about the availability, botanical characteristics, commercial value, and therapeutic applications of medicinal plants.

# Hypothesis

To evaluate the phytochemical, microbiological and allied properties of different plants of species Trichodesma relating to their quality control and standardization parameters which showing very significant component of locally used medicine.

# Research Question

Four species of *Trichodesma* have been sequenced *Trichodesma zeylanicum*, *Trichodesma inaequale*, *Trichodesma indicum* and *Trichodesma scotia* all four species group together in polytomy. The relationship between them cannot be deciphered as the marker is very less.

# Theoretical and conceptual framework

# Research Methodology:

## I. Morphology and Application

**A. Field Work**:

Regular field tour will be arranged in proper season for collection of required

Plant material from different areas of Parbhani, Nanded , Hingoli, Sambhajinagar,Jalana,district of Marathwada region.

**B. Laboratory work:**

1.In laboratory with the help of Literature correct identification of the required species will be done.

2. Collected material will be dried at room temperature and the samples were then crushed to form the powder using grinding machine.

# II. Pharmacognostic study

**Anatomy**

T.S. of leaf, T.S. of Petiole, T.S. of Stem, T.S. of root and T.S. from node.

**Microscopic study Or Quantitative microscopy:**

Stomatal Index, Stomatal number, Vein termination number, Vein islets number, Palisade ratio.

**Methods of Data analysis:**

a. Isolation and separation of Extract:

b. The Powdered part that is Leaf, stem, root or inflorescence weighted, tied up in filter paper.

# III. Physical evaluation:

a. Moisture Value.
b. Extractive values in different solvent.
c. Ash value: Acidic soluble ash and Acidic insoluble ash.

# IV. Phytochemical screening:

a. Quantitative Screening: TLC, HPTLC, Chromatography etc.
b. Histochemical screening

## V. Qualitative Phytochemical analysis:

Estimation of Tannins, Saponins, Alkaloids, Carbohydrate, Glycosides, Proteins, Phytosterols, lipid, Flavonoids, Amino acid and phenolic.

Preliminary Screening: IR, NMR and Mass spectroscopic tests for the detection of chemical compounds.

## VI. Biological assay:

a. Antioxidant Property
b. Antimicrobial Activity
c. Anti-Inflammatory Activity

• Evaluation of Physicochemical properties and pharmacological properties.

## Plan of research work

## First year :

1. Literature survey, Field work in proper season. Acquiring books and journals.

2. Survey of different areas for collection and identification of various species of Trichodesma from Marathwada region.

3. Type of species will be collected and identified with the help of Floras.

4. Parameters will be noted like moisture content, Leaf constant, Leaf area index, Stomatal index, Acid soluble ash etc.

## Second year :

1. Morphology of plants

2.Preservation of the plant species in the form of herbaria and their parts for chemical analysis

3.Anatomy of different organs including observations of transverse sections that is leaf, petiole, stem, node and root Maceration of stem and root

4.Separations and drying of materials of species collected from different areas of Marathwada region.

# Third year :

Extraction of compounds of various organs of plant species using different Solvent systems:

a. Histochemical tests for localization of starch, fat, carbohydrate, flavonoids, gum and mucilage, protein, tannin, saponin, glycoside and alkaloids have been carried out.
b. Reactivity of the plant powders and extract in different solvents with different chemical constitution will be performe which shows specific coloration which proved useful to detect purity of drug.

# Phytochemical Analysis:

a. Quantitative: TLC, HPTLC, Chromatography
b. Qualitative: Total Carbohydrate, Total Protein, Total fat, Total Saponins, Total Tannins, Total Alkaloids, Total oil, Total Flavonoids, Total glycosides
c. Preliminary screening and IR, NMR and Mass spectroscopic tests for the detection of compounds will be made.

## Biological Assay

a. Evaluation of Antimicrobial, Antioxidant, inflammatory, dermatitis and also for insect repellant activity.
b. Analysis and conclusion of work.
c. Photographs, histograms, tables etc. will be worked out wherever required Completion of data.
d. Analysis of data and compilation of results.
e. Thesis writing.

# Conclusion

Plants of genus Trichodesma have many bioactive constituents, many of which have been used in traditional folk medicine throughout the world. Phytochemical investigation of various Trichodesma species have revealed that many components from this genus express significant biological and pharmacological activities. Nevertheless, there are still many Trichodesma species that have received very little or no attention. Further phytochemical and biological studies should be done on these species.

# References


1. Ariyapadath.S.., Neethu.R., 2020.Classification of plant leaf using shape and texture Features. Research gate 269-282.
2. P.P.Sharma , R. P. Patil 2008 . Plants used for the treatment of wounds by trials of tornamal plateuu of Maharashtra. Ann.For.,16(2) : 301-305.
3. Sharma . R., Singh. B., Chandrawat. P. 2009. Ethanomedical, pharmacological properties and chemistry of some medicinal plants of Boraginaceae India. Journal of medicinal plants research 3 (13) : 1153-1175.
4. Vijaya . K., Chavan.P. 2009. Pharmacognosy Review 3 (5) 154-169.
5. Shinde R. D., Gupte. N. 2023.The systematic position of some species of Boraginaceae family as Inferred using Rbcl barcode marker of chloroplast genome . Annal of plant sciences. 12(4) :5842-5854.
6. E.Retief , A. E. Van Wyk. 2002.The genus *Trichodesma* ( Boraginaceae) in Southern Africa Bothalia. 32(2) : 151-166.
7. Abdelgawad.A., Bassossy. T., Ahmed. F. 2021.A review of phytochemical, pharmacological and ethnopharmacological aspects of genus *Trichodesma*. Indian Journal of Natural Products and Resources.12(3) : 333-347.
8. Chacon.J., Luebert. F., Hilger. H., Ovchinnikova. S., Cecchi. L., Guilliams. C., Lehman., Story.K., Simpson. M., Weigend. M. 2016. The borage family (Boraginaceae.S.Str.) : A revised infrafamilial classification based on new phylogenetic evidence, with emphasis on the placement of some enigmatic genera. The Journal of the International Association for Plant Taxonomy.65(3) ; 523-546.

9. Abdelwad.A.M., Taha Al El Bassossy., Ahmed. F. A. 2021.A review on phytochemical ，pharmacological and ethnopharmacological aspects of genus *Trichodesma*. 12(3) : 333-347.
10. Mesallamy . A. M., Ahmed. F. A., Elhaw. M. H., lbrahim. T. A.2015. Chemical investigation and evaluation of Antimicrobial activity of *Trichodesma* ehrenbergii Schweinf.ex. BOI SS Growing widely In Gebeleba, Egypt. Indo American journal of pharmaceutical sciences 2(5) : 961-966.
11. Badwaik. P., Khobragade. P., Rathi. B. 2019.*Trichodesma indicum* (Adhapushpi): A review. Journal of School of Advanced Studies. 2(1) 28-35.
12. Gupta.P.S., Vishwakarma. K., Soni.P.2024.Medicinally important plants of Boraginaceae family. African Journal of Biological Sciences . 6(4) : 6013-6021.
13. Hamalakshmi., Joyhee. S., Babu. S., Sipa. M.2018. *Trichodesma indicum* – An overview Int. J. Pharm. Sci. Rtv., 48(2) : 63-69.
14. Omar.M., Defeo. J., Youngken. H. 1983. Chemical and toxicity studies of *Trichodesma africanum*. Journal of Natural products 46 (2) :153-156.